



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/676,982	10/01/2003	Christian L. Belady	10018060-3	7690

22879 7590 07/12/2005

HEWLETT PACKARD COMPANY
P O BOX 272400, 3404 E. HARMONY ROAD
INTELLECTUAL PROPERTY ADMINISTRATION
FORT COLLINS, CO 80527-2400

EXAMINER

DUONG, THO V

ART UNIT	PAPER NUMBER
----------	--------------

3743

DATE MAILED: 07/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/676,982

Applicant(s)

BELADY ET AL.

Examiner

Tho v. Duong

Art Unit

3743

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 April 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2-15 and 17-25 is/are pending in the application.
- 4a) Of the above claim(s) 3,4,6-9,15,17,19,20 and 25 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 2,5,10-14,18 and 21-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

Applicant's amendment filed 4/19/2005 is acknowledged. Claims 2-15 and 17-25 are pending. Claims 3,4,6-9,15,17-20 and 25 remain withdrawn from further consideration. In view of the applicant's amendment, the previous objection to the drawing has been withdrawn.

Response to Arguments

Applicant's arguments filed 4/19/2005 have been fully considered but they are not persuasive. Applicant's argument that the spring element (36) in Chu'281 is not flush to any head of the pin (24) has been very carefully considered but is not deemed to be persuasive because Chu'281 discloses (figure 6) that the lower planar surface of the spring element (36) is flush with a flat surface of the pin head (25). See figure A bellow.

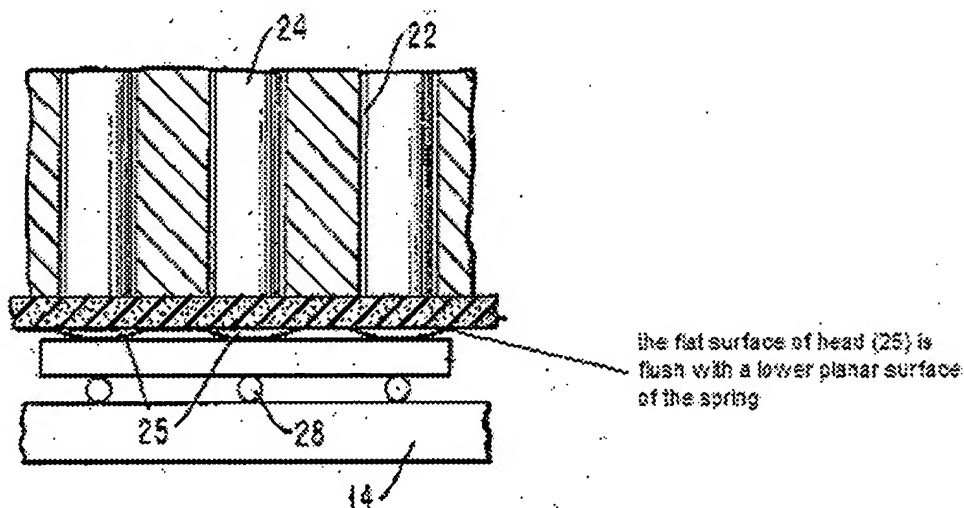


Figure A: The modified figure corresponds to figure 6 with flushed surface shown

Regarding claim 12, applicant's argument that Chu'385 fails to disclose "the pinheads arranged in geometric pattern that covers an area extending beyond a region of contact between the pin

Art Unit: 3743

heads and the object" has been very carefully considered but is not deemed to be persuasive.

Chu'358 discloses figure 2 that the pins (210,212) have their heads arranged so that the pinheads also covers an area extending beyond a region of contact between the pin heads and the object.

(See figure B bellow).

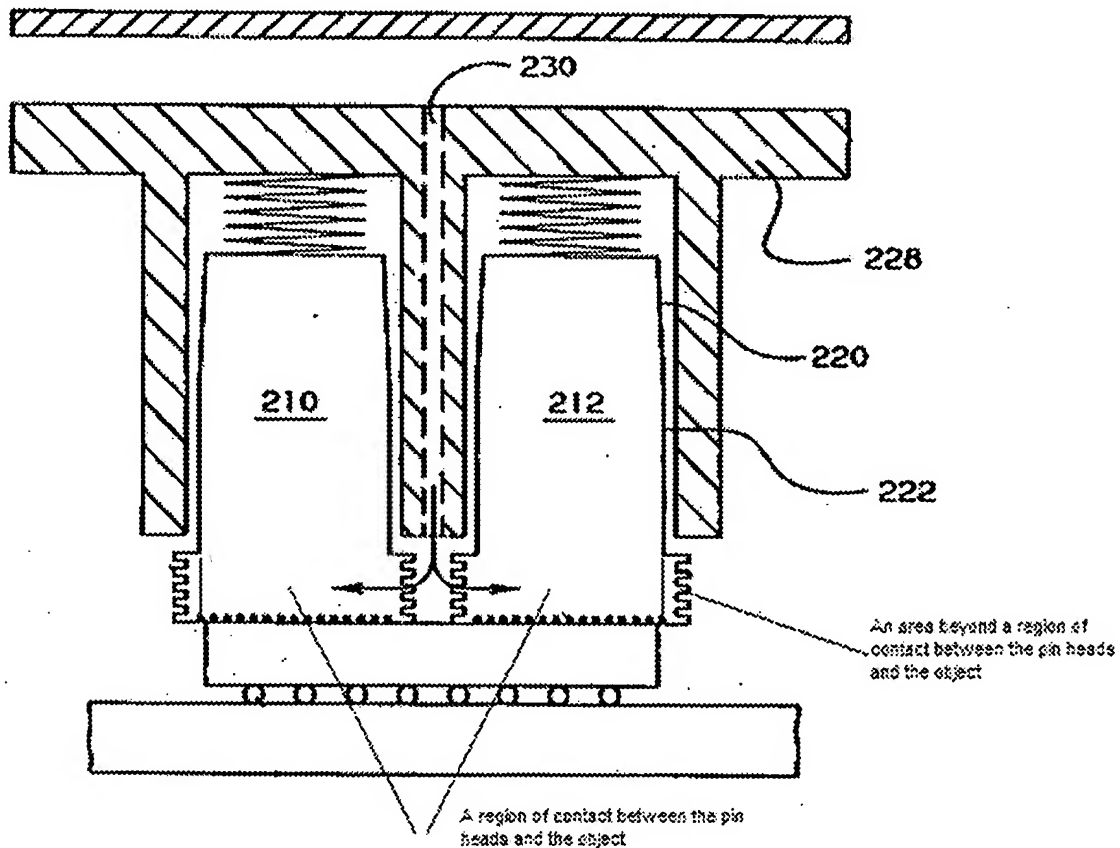


Figure B: The modified figure corresponds to figure 2 of Chu'358 with limitation shown

Regarding claim 18, applicant's argument has been very carefully considered but is not deemed to be persuasive. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208

Art Unit: 3743

USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Reference to Lamb was not relied on to teach that the pins head are flush with the face of the spring but to disclose that the sponge spring material is a thermal conductive material. Applicant is advised to see previous response regarding Chu'281 for the teaching of face of the spring and the pinheads being flushed.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 2,13 and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Chu (US 4,226,281). Chu discloses (figures 1, 6 and column 4, line 65- column 5, line 2) a thermal interface (10) comprising a thermal spreader (18) forming a plurality of passageways (22); a spring element such as layer with a substantially planar face of sponge like material (36) coupled with the spreader (18); and a plurality of thermally conductive pins (24) for the passageways and perpendicular with the planar face of the spring element (36); each of the pins (24) having a head (25) and a shaft moving with the spring element (36); at least part of the shaft being internal to the passageway and forming a gap between the pin (24) and the gap (22), which is filled with a thermal grease or helium gas; the pin heads (25) collectively and macroscopically conform to an object (12,14) couple thereto; the head (25) being substantially flush with the face of the spring element (36); the object comprising a semiconductor die (12). Regarding claim 16,23 and 24,

Art Unit: 3743

Chu discloses all of the structural limitations of the invention. Therefore, it is believed that Chu's thermal interface is capable of performing the method for transferring thermal energy from a body to a heat sink as claimed.

Claims 12 and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Chao- Fan Chu et al. (US 5,097,385). Chu discloses (figure 2) a thermal transfer interface comprises a thermal spreader (228) forming with a plurality of passageways; a spring element coupled with the spreader; a plurality of thermally conductive pins (210,212) for the passageways, each of the pins having a head and a shaft moving with the spring element, at least part of the shaft being internal to the passageway and forming a gap with an internal surface of the passageway, wherein the pin heads collectively and macroscopically conform to a semiconductor die (204); and the pin heads arranged in a geometric pattern that covers an area (205) extending beyond a region of contact between the pin heads and the die.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 18, 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chu (U 4,226,281) in view of Lamb et al. (US 5,920,457). Chu substantially discloses all of applicant's claimed invention as discussed above except for the limitation that the rubber sponge material is thermal conductive. One of ordinary skill in the art would see that if the sponge

Art Unit: 3743

material (36) is a thermal conductive material, it will enhance the heat dissipation of heat generating device (12) by forming an additional thermally conductive path between the head of the pin and the heat spreader (18). Attention is now directed to reference to Lamb for teaching of thermally conductive sponge material being both springy and thermally conductive using in a heat dissipation apparatus. Lamb discloses (figure 1 and column 2, lines 52-65) a heat dissipation apparatus having an interface material (120) disposed between a heat generating source (102) and a heat sink (130) wherein the interface material is made of a rubber sponge material which has a thermal conductivity of 0.5wat/(deg-K-meter) at 5 psi for the purpose of providing a thick compressible interface material and a good conduction heat path between the heat source and the heat sink. Since Chu and Lamb are both from the same field of endeavor, the purpose disclosed by Lamb would have been recognized in the pertinent art of Chu. It would have been obvious to one having ordinary skill in the art to make Chu's sponge material a thermal conductive sponge material as taught by Lamb for the purpose of providing a thick compressible interface material and a good conduction heat path between a heat source and a heat sink.

Claims 11 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chu (US 4,226,281) and Lamb in view of Chu (US 5,394,299). Chu ('281) and Lamb substantially discloses all of applicant's claimed invention except for the limitation that the pin shaft and the passageways being substantially rectangular. Chu (5,394,299) discloses (figure 2 and column 6, lines 14-21) a thermal transfer interface that has a thermal spreader having a plurality of passageways (14) and pistons (18) located within the passageways wherein the shape of the

Art Unit: 3743

passageways (14) and piston are not limited to circular but rather may be rectangular for the purpose of increasing the heat transfer surface area between the pistons and the thermal spreader. It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ Chu's (5,394,299) teaching in the combination device of Chu ('281) and Lamb for the purpose of increasing the heat transfer surface area between the piston and the thermal spreader.

Claims 5, 10 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chu (4,226,281) and Lamb in view of Antonetti et al. (US 4,153,107). Chu and Lamb substantially discloses all of applicant's claimed invention as discussed above except for the limitation of a vent coupled to a passageway. Antonetti discloses (figure 1) a heat dissipation device that has a plurality of pins (26) movable within a passageway of a heat spreader (16), a helium gas is filled within the passageway and a vent (34) is coupled to the thermal spreader for the purpose of filling in or venting out the gas. Since Chu and Antonetti are both from the same field of endeavor and/or analogous art, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use Antonetti's teaching in the combination device of Chu'281 and Lamb for the purpose of filling in or venting out the gas.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO**

Art Unit: 3743

MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tho v. Duong whose telephone number is 571-272-4793. The examiner can normally be reached on M-F (first Friday off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Henry Bennet can be reached on 571-272-4791. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TD



Tho v Duong
Primary Examiner
Art Unit 3743

TD
June 29, 2005